

SUBJ: HORIZONTAL DRILLING MEETING NOTES 1/24/02

463186

SPECTRON

1/24/02

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Mark Kluger	Dajak	302-655-6651

PURPOSE: THE PURPOSE OF THIS MEETING WAS TO
1ST HEAR A PRESENTATION ON THE CAPABILITIES
OF ~~HORIZ~~ HORIZONTAL DRILLING AT THE SPECTRON
SITE, AND 2ND TO DISCUSS WITH MDE & WESTON
(CONTRACTOR FOR EPA) (WITHOUT HORIZONTAL DRILLERS)
POSSIBLE REMEDIES TO BE USE TO TREAT
CONTAMINATED SOIL IN THE SHALLOW BEDROCK,

THE MEETING ENDED WITH A FOCUS ON USING
HORIZONTAL DRILLING (2 x 400 ft wells) WHICH
WOULD ALLOW BIO-DEGRADATION WITH AT A RATE
THAT WOULD NOT CREATE OFF GASING VIA BIO-
SPARKING.

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February 18, 2002

Mr. Robert Sanchez
Remedial Project Manager
US EPA Region III, 3HS23
1650 Arch Street
Philadelphia, PA 19103-2029

Via Fax: (215) 814-3002

Dear Mr. Sanchez:

Herewith please find a Summary Venture Guidance Estimate for the Galaxy/Spectron Site. It covers the installation and on-going performance monitoring of three horizontal well aerobic, co-metabolic biosparge systems. The cost of vertical monitoring wells and their operation is not included. The total cost, including two years operation including contingencies, is \$1,983,059.

As an alternative to installing a 3-well system immediately, you may want to install and operate a single-horizontal well Pilot Project for the site for two years. We would do so at a cost of approximately \$789,932 including contingencies.

The single-well Pilot Project would be useful for determining the actual effective air permeability of the site, the distance-of-influence of the biosparge air, the rates of contaminant removal as a function of system operation, and the potential for release of odorous materials at the site. This would also give you personal experience with air-based horizontal well remediation systems.

If either of these options are of interest to you, we can develop a more detailed Venture Guidance Estimate or Cost Proposal under contract for your use.

Thanks for the opportunity to work with you on this project. Please call if you have any questions.

Regards,

Louis B. Fournier, Ph.D.
President

cc: Mark Kluger

Proposal No. 1¹
Environmental Protection Agency
Summary Venture Guidance Estimate²
Galaxy/Spectron Site
2/18/2002

Basis

- 3 horizontal biosparge wells - 600' total length, 400' screen, 100' header, 100' tail.
- Wells placed 20' below grade and 10' below water table.
- Wells placed parallel to water table.
- Design target flow rate = 0.5 scfm/ft screen (300 scfm total flow)
- Rotary lobe blowers acceptable and applicable
- Propane injection with explosion-proof controls (XP) required
- Monitoring wells, reporting, interfacing with regulatory agencies not included
- Drilling waste characterization and disposal not included
- Cost of electrical power assumed at \$0.075/KWH

Cost Summary

Total Anticipated Project Cost with contingencies: \$1,983,059

Cost Elements

The present Summary Venture Guidance Estimate includes the following cost elements:

- Site visit and project planning
- Conceptual Design computer modeling and report preparation
- Preliminary engineering and design
- Revise preliminary engineering and design drawings and re-submit
- Equipment and instrumentation procurement support
- Oversight of equipment and instrumentation procurement and fabrication
- Cost of equipment, structure, piping, and housing (3 systems)
- Fabrication of custom-slotted well materials and well installation (3 wells)
- Preparation of as-built/as-installed well drawings and equipment installations

¹ This Summary Venture Guidance Estimate and the contents herein are copy-write protected by STAR Environmental, Inc. It is not to be used for any purpose other than to satisfy the request of Robert Sanchez and the Environmental Protection Agency (EPA) for the Galaxy-Spectron site remediation project and considerations. Release to a third party other than EPA and Roy F. Weston project participants without written authorization from STAR Environmental, Inc. is prohibited and a violation of federal copy-write law.

² This Summary Venture Guidance Estimate is not to be taken as a firm cost proposal. It is based on information which STAR Environmental, Inc. believes to be reliable. However, changes in defined scope, site conditions, price changes, and other cost items could result in this estimate being increased or decreased.

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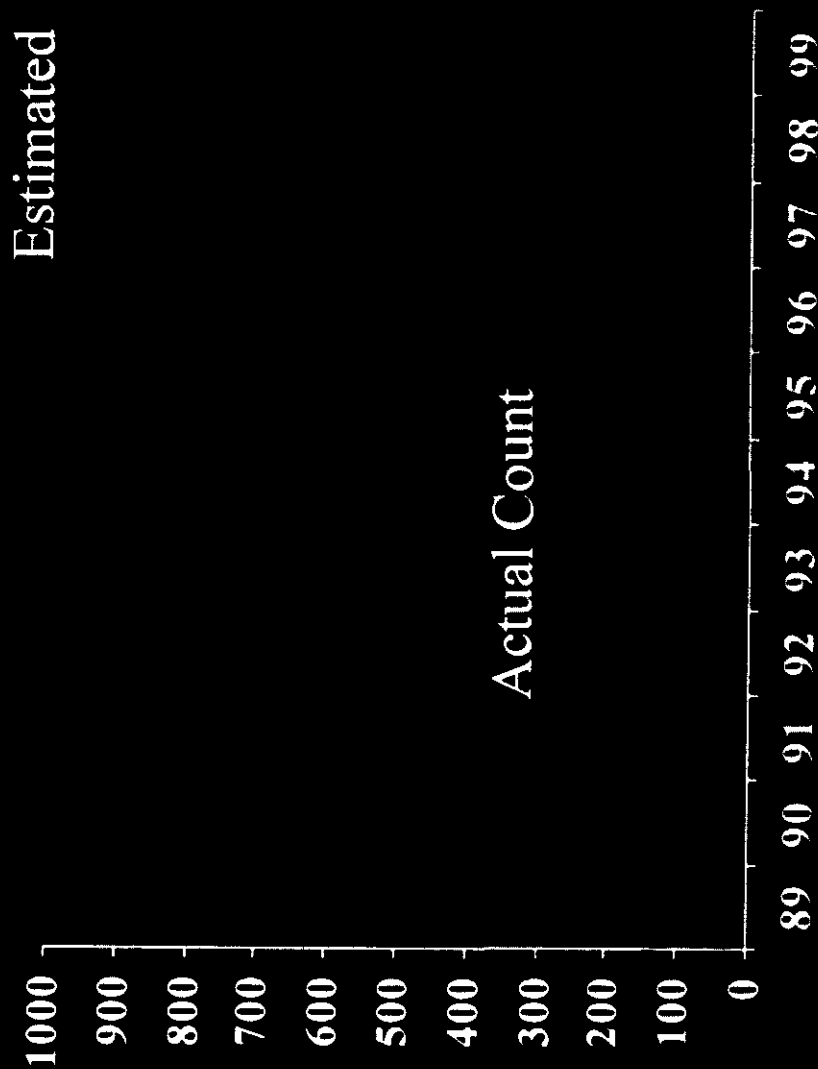
- System start-ups (3) and initial performance testing
- 30-day system performance evaluation and adjustment
- Quarterly performance checks and system inspections for each blower package for 8 quarters
- On-going system performance evaluation (2 years)
- On-going project support (2 years)
- Emergency response actions (2 years)
- Cost of propane

Excluded Cost Items

Excluded from these costs are the following:

- All project costs past 24 months of operation, if any.
- Project shut-down costs.
- Monitoring and analytical costs.
- Routine site visits and equipment maintenance
- Costs of replacement equipment and/or parts, if any
- *Cost of providing electrical service to the site, if any*
- Costs of preparation of reports for regulatory agencies.
- Costs of meetings, if required, with PRP group(s).
- Costs of supplying educational documentation related to aerobic, co-metabolic biodegradation and presentations thereof.

Number of Horizontal Wells per Year



STAR Environmental, Inc.

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